

What is claimed is:

1. A high-frequency switching module primarily including a switching circuit and a filtering circuit, comprising:

5 a multi-layer assembly having a plurality of dielectric sheets of layers placed one over the other;

a plurality of high-frequency terminals provided on outer surfaces of the multi-layer assembly;

10 said switching circuit formed in the layers of said multi-layer assembly, having one end thereof connected to a first high-frequency terminal of said plurality of high-frequency terminals; and

15 said filtering circuit formed in the layers of said multi-layer assembly, having one end thereof connected to the other end of said switching circuit and the other end connected to a second high-frequency terminal of said plurality of high-frequency terminals,

20 wherein said high-frequency terminals are provided on a mounting side surface of said multi-layer assembly while lateral sides of said multi-layer assembly are not provided with any electrode for said high-frequency terminals.

25 2. The high-frequency switching module according to claim 1, wherein the connection between one end of the switching circuit and the first high-frequency terminal and

the connection between the other end of the filtering circuit and the second high-frequency terminal are implemented through corresponding via-holes provided in the multi-layer assembly.

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3. The high-frequency switching module according to claim 1, wherein the multi-layer assembly has a grounding electrode provided on a dielectric sheet closer to the mounting side surface than from the filtering circuit and the switching circuit within the multi-layer assembly and the grounding electrode extends to an outer edge of the dielectric sheet.

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4. The high-frequency switching module according to claim 1, wherein each of the high-frequency terminals is arranged extending along the outer edge of the mounting side surface of the multi-layer assembly so that each electrode width at the outer edge of said multi-layer assembly is greater than that at the inner region of the same.

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5. The high-frequency switching module according to claim 4, wherein the high-frequency terminals are formed of substantially a D character shape.

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6. The high-frequency switching module according to claim 4, wherein the high-frequency terminals are positioned as spaced by a given distance from the outer edge of the multi-layer assembly.

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7. The high-frequency switching module according to claim 1, wherein said multi-layer assembly has a rectangular four-sided outer shape and has connection terminals provided at corners of the mounting side surface thereof for external connection reinforcement.

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8. The high-frequency switching module according to claim 1, wherein said multi-layer assembly has a rectangular four-sided outer shape and has connection terminals provided at an inner region of the mounting side surface thereof for external connection reinforcement.

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9. The high-frequency switching module according to claim 8, wherein the connection terminals are positioned at substantially the center of the mounting side surface of the multi-layer assembly.

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10. The high-frequency switching module according to claim 9, wherein the connection terminals are positioned in symmetry with respect to substantially the center of the

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mounting side surface of the multi-layer assembly.

11. The high-frequency switching module according to claim 8, wherein the connection terminals are connected to the grounding electrodes through corresponding via-holes provided in said multi-layer assembly.

12. The high-frequency switching module according to claim 1, wherein the high-frequency terminals are equipped with solder balls.

13. The high-frequency switching module according to claim 1, wherein at least one of the high-frequency terminals is located opposite to an inner electrode which forms the one end of the high-frequency switching module comprised of the switching circuit and the filtering circuit, thus forming a capacitor circuit.

14. A high-frequency apparatus comprising:  
a high-frequency switching module defined in claim 1;  
and

a circuit board on which the high-frequency switching module is mounted, wherein

lands provided on said circuit board are arranged smaller in size than the high-frequency terminals of said

high-frequency switching module.

15. A high-frequency switching module primarily including a switching circuit and a filtering circuit, comprising:

a multi-layer assembly having a plurality of dielectric sheets of layers placed one over the other;

a plurality of high-frequency terminals provided on outer surfaces of the multi-layer assembly;

10 said switching circuit formed in the layers of said multi-layer assembly, having one end thereof connected to a first high-frequency terminal of said plurality of high-frequency terminals; and.

15 said filtering circuit formed in the layers of said multi-layer assembly, having one end thereof connected to the other end of said switching circuit and the other end connected to a second high-frequency terminal of said plurality of high-frequency terminals,

20 wherein a multi-layer capacitor which forms a part of said switching circuit and/or the filtering circuit is mounted on said multi-layer assembly so that the direction of stacking layers in said multi-layer assembly extends substantially vertical to the direction of stacking paired capacitor electrodes provided on layers of said multi-layer capacitor.

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16. A high-frequency switching module primarily including a switching circuit and a filtering circuit, comprising:

5 a multi-layer assembly having a plurality of dielectric sheets of layers placed one over the other;

a plurality of high-frequency terminals provided on outer surfaces of the multi-layer assembly;

10 said switching circuit formed in the layers of said multi-layer assembly, having one end thereof connected to a first high-frequency terminal of said plurality of high-frequency terminals; and

15 said filtering circuit formed in the layers of said multi-layer assembly, having one end thereof connected to the other end of said switching circuit and the other end connected to a second high-frequency terminal of said plurality of high-frequency terminals,

20 wherein a chip inductor which forms a part of said switching circuit and/or the filtering circuit is mounted on said multi-layer assembly so that the axis of electrode coils in said chip inductor extends substantially vertical to the axis of a spiral transmission line which forms a part of said switching circuit and/or the filtering circuit in said multi-layer assembly.

17. A high-frequency switching module primarily including a switching circuit and a filtering circuit, comprising:

5 a multi-layer assembly having a plurality of dielectric sheets of layers placed one over the other;

a plurality of high-frequency terminals provided on outer surfaces of the multi-layer assembly;

10 said switching circuit formed in the layers of said multi-layer assembly, having one end thereof connected to a first high-frequency terminal of said plurality of high-frequency terminals; and

15 said filtering circuit formed in the layers of said multi-layer assembly, having one end thereof connected to the other end of said switching circuit and the other end connected to a second high-frequency terminal of said plurality of high-frequency terminals,

20 wherein a strip line which forms a part of said switching circuit and/or the filtering circuit is partially located in said multi-layer assembly while the remaining part of the strip line is located on a circuit board on which said multi-layer assembly is mounted.

25 18. The high-frequency switching module according to claim 17, wherein the strip line which is connected to a control terminal for controlling the switching circuit is

partially located in the multi-layer assembly while the remaining part of the strip line is located on a circuit board on which said multi-layer assembly is mounted.

- 5           19. The high-frequency switching module according to claim 17, wherein the impedance of the strip line located in the multi-layer assembly is smaller than the impedance of the strip line located on the circuit board so that the total electric length is not greater than  $\lambda/4$ .